


TeleEngineering Support to *Operation Iraqi Freedom*

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Army transformation and the concept of lighter, more lethal and smaller footprint-deployed forces, are receiving great assistance from the U.S. Army Engineer Research and Development Center (ERDC). ERDC, the consolidated Corps of Engineers (COE) research laboratories, developed and implemented the concept of TeleEngineering to provide deployed soldiers a “reach-back” engineering analysis capability for planning and executing deliberate and contingency missions.

Military engineers work to repair a bridge in Iraq using solutions provided by ERDC.

During *Operation Enduring Freedom (OEF)* and *Operation Iraqi Freedom (OIF)*, TeleEngineering became a critical component in solving engineering challenges by providing direct access to CONUS-based subject matter experts (SMEs) in the ERDC, COE districts and divisions, DOD, other government agencies, academia and private industry.

TeleEngineering Tools

ERDC researchers, in support of TeleEngineering operations, have developed important tools to provide the necessary support in the very short time frames required by the deployed engineer for mission completion. A successful tool, the satellite-based TeleEngineering Communications System enables deployed personnel to send and receive data and to conduct video teleconferences in a secure or non-secure manner. Support can be obtained through TeleEngineering over any available communications infrastructure that meets the user's requirements — telephones, facsimile machines, computer networks (e-mail)

and video-conferencing systems. However, remote areas often lack modern communications infrastructure such as phone lines, data lines and Integrated Services Digital Networks. These problems led ERDC researchers to develop a deployable, versatile communications system capable of supporting a wide range of voice and data services on a global basis.

The Deployable TeleEngineering Communications System is a critical communication component when existing infrastructure is unavailable, damaged or nonexistent. Compact and highly mobile, the system combines a suitcase-sized satellite terminal with a laptop, camcorder and roll-around secure video-conferencing unit. It can send and receive computer files, voice communications, video stills and 2-way interactive video conferencing. The COE significantly expanded TeleEngineering capabilities prior to *OEF* to include the deployment of Corps military and civilian personnel for on-site expertise to facilitate a direct link to

CONUS experts. This expanded capability is called Field Force Engineering (FFE).

TeleEngineering communications kits were integral to the FFE initiative that linked the COE with forward-deployed troops during *OEF*, and the TeleEngineering concept once again proved its worth during *OIF*.

OIF and TeleEngineering

On March 19, 2003, when President George W. Bush gave the order for coalition forces to hit a compound where it was believed key Iraqi officials were meeting, *OIF* began. Although military leaders had been planning the operational details of the campaign for months prior to the air strike, ERDC assisted those efforts through TeleEngineering by providing airfield, bridge and infrastructure assessments and by evaluating water control structures, water system management issues and port restoration requirements. ERDC also worked directly with soldiers

Another TeleEngineering Tool Used Extensively in Iraq

Another tool developed through TeleEngineering is the Automated Route Reconnaissance Kit. A critical mission conducted by engineers, infantry scouts and Special Forces teams is mounted route reconnaissance, which is a time-consuming and labor-intensive activity. The Automated Route Reconnaissance Kit allows more accurate and detailed data to be collected along the route, permitting recon teams to focus on dismounted reconnaissance objectives and other critical mission aspects.

The kit incorporates and integrates accelerometers, global positioning satellite technology, a laser range

finder, digital camera, audio technology and touch-screen computer into a collection sensor package that significantly reduces the time required for a platoon to conduct route reconnaissances. The kit also contains analysis software that automatically calculates the radius of curvature and slope of routes being reconnoitered. These two calculations require a significant amount of time and are critical pieces of information for the maneuver commander to use in selecting main supply routes or maneuver corridors. Four kits were used in planning missions prior to *OIF*, and at least two were actually used during operations.

on the ground in surrounding countries to provide immediate technical assistance on problems encountered in-theater.

Some of the issues encountered before and during military operations were:

Dam breach analysis. ERDC military hydrology experts looked at worst-case scenario flooding if a massive controlled release was initiated at certain dams or if they were breached by expedient demolitions to determine how the flooding would impact maneuverability and operations downstream.

Gap crossings and cross-country mobility. Engineers provided military planners with solutions for potential irrigation canal, ditch and trench crossings that had been set ablaze with burning oil. ERDC researchers also provided maneuver units with analysis concerning cross-country movements in the area of interest to determine if specific vehicles could travel from point-to-point.

Bridge upgrade specifications. Soldiers in-country gathered information on bridge damage in several locations and provided the data to ERDC through TeleEngineering communications equipment. SMEs analyzed the data and photos and determined the types of traffic the bridges could sustain, as well as the upgrades necessary to sustain traffic if damage to the bridges increased.

TeleEngineering Examples

During one such mission, the ERDC TeleEngineering Operations Center (TEOC) received a phone call via satellite from a soldier with the 54th Engineer Battalion. A bridge on the

Euphrates River had been damaged, and the engineers needed help. The engineers agreed to provide the TEOC measurements and photos, but were delayed for 15 minutes while they dealt with Iraqi snipers.

Once the bridge data and photos were received by the TEOC, SMEs quickly outlined several courses of action. A field-expedient solution was provided just 2 hours later. The 54th Engineer Battalion's soldiers were impressed that they were able to get a technical solution so quickly using the assets they had at hand.

Another example of TeleEngineering support came after U.S. forces seized control of the Baghdad International Airport. Engineers at the TEOC in Vicksburg, MS, received a call at 10:30 p.m. local time, asking for COE assistance to help get water and electricity to the airport. TEOC engineers set up communications between the military unit at the Baghdad Airport, the headquarters unit in the rear, the lead infrastructure assessment team at the Corps Mobile District's 249th Prime Power Engineer Battalion, the TransAtlantic Programs Center and the ERDC. Within 45 minutes, pictures and blueprints started coming in from Iraq and discussions were quickly initiated to provide the answers the U.S. forces needed. As a result, the airport's water and electricity were restored in a minimal amount of time.

Success Continues

Today, as military and civilian personnel work to rebuild Iraq and restore water, power, food and other services to the Iraqi people, TeleEngineering continues to play a vital role. Soldiers with the 864th Engineer Battalion accidentally broke a

natural gas pipeline while doing restoration work. They called the TEOC in Vicksburg. Working with the Corps Mobile District, the TEOC developed a workable solution in short order.

From daily video teleconferences that allow military leaders in Iraq to communicate with each other from various locations and with SMEs in the United States, to receiving and processing data received over secure networks, TeleEngineering continues to provide solutions for problems in the field from thousands of miles away.

The 130th Engineer Brigade commander summed up the sentiments of many engineers concerning the TeleEngineering capability and deployable TeleEngineering communications equipment. "We need one in every engineer battalion throughout the Army, *period*. Buy it. Don't discuss it; don't do a staff study . . . just buy it."

TeleEngineering is a huge success story for the U.S. military deployed around the globe, and will continue to evolve and become more integral to future operations.

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